ASX

Ultra-High Performance Active Subwoofer

commercial installation

The Martin Audio ASX subwoofer is a revolution in ultra-efficient, low frequency sound reproduction – achieving the highest ever SPL from a single low frequency enclosure housing a single drive unit.

At the heart of the ASX is a unique, patented* 21" (530mm) transducer/Class D amplifier/DSP combination which provide double the output capability of a conventionally driven loudspeaker driver of the same size. When incorporated into a Martin Audio Hybrid® horn design, the complete system can deliver an unsurpassed 152dB peak output (measured) from a single enclosure. This is typically greater than can be achieved by two 2 x 18" (460mm) conventionally driven, reflex subwoofers.

Additionally, the adaptive control loop technology maintains linearity up to the maximum output level and power compression is virtually eliminated.
The dynamic, low distortion sonic signature of the ASX at full power is a revelation.

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ASX

Ultra-High Performance Active Subwoofer

features

- Ultra-efficient, with 152dB @ 1m half space maximum output
- Hybrid® large folded horn and ported design, -3dB @ 30Hz
- Single 21" (530mm)/6" (150mm) voice coil driver with 2.4" (60mm) peak-to-peak excursion
- DSP-based, adaptive control loop technology maintains linearity up to maximum output level. Power compression virtually non-existent
- Dedicated Class D amplifier with 8.5kW peak power
- Switched mode power supply with PFC (Power Factor Correction) and global mains voltage operation
- DSP on board providing delay, EQ and filtering as well as amplifier and driver excursion limiting
- PC based software application for parameter configuration

applications

- Premium club installations
- Stadium installations
- Theme park special effects

Hybrid® horn

Martin Audio's trademark Hybrid® horn design marries the very high efficiency of a large folded horn with the low frequency extension of a bass reflex enclosure. With a path length of 2.13 metres (7ft), the horn dominates the output down to 40Hz. Below this frequency the reflex ports take over, extending output to -3dB @ 30Hz. The Hybrid® design maximises both the efficiency and bandwidth within the practical limits of enclosure size and has the fast transient performance long associated with Martin Audio bass horns.

The chamber housing the 21" (530mm) transducer is ported to the front of the enclosure, with special attention given to the cross-section profile of the ports to equalise the air pressure at the port entry and exit and reduce the air velocity at the inner and outer port edges to reduce air noise. The port profile also minimises the acoustic resistance to maximise the output from the ports.

Extensive bracing is employed throughout the 18mm birch-ply enclosure and aluminium U-channel bracing is incorporated into the access door to resist the unusually high pressures generated within the driver chamber. The ASX is ground stackable in letterbox orientation, with interlocking skids. Handles and removable castors assist positioning during installation.

IPAL (Integrated Powered Adaptive Loudspeaker)

The IPAL principle maximises the efficiency of electro-acoustic conversion of a transducer i.e. the way in which the mains input power is converted into actual acoustic output.

Traditional transducer design is compromised by the need to present an amplifier with a load impedance that is as resistive as possible – which implies a loss of efficiency of the transducer and also sets a limit on the current in the voice coil because of thermal dissipation. A transducer that would minimise the voice coil resistance, maximise the Bl "force factor", or that would present a more reactive load, would enable a significant increase in the conversion efficiency.

In the practical embodiment of the IPAL principle in the ASX, DSP controlled, active feedback topology "emulates" an ideal virtual "target" transducer to maximise efficiency and maintain linearity at maximum excursion. Distortion is reduced by up to 20dB and power compression virtually eliminated. The IPAL system in the ASX comprises a dedicated Class D amplifier module, a DSP system, a 21" (530mm) transducer unlike any other and a differential pressure sensor.

the drive unit

A neodymium motor system of immense proportions, coupled with a voice coil impedance of less than one ohm enables the drive unit to generate an unprecedented force upon the air load presented by the enclosure. This ability dominates the rest of the driver's electro-acoustic parameters thus creating the "virtual transducer". By adjusting the processing in the control loop, fixed parameters such as moving mass, resonant frequency and even cone area can be "virtually" adjusted and optimised.

To handle the unprecedented forces and resultant air pressures requires an extremely strong cone material. Made from a mix of cellulose and carbon fibres, the cone has excellent strength when in tension and compression – unlike woven aramid fibre cones, whose compressive strength is much lower than their tensile capabilities.

amplification and DSP

The efficient Class D amplifier topology in the ASX is capable of delivering a peak power of 8.5kW and dramatically reduces the amount of energy dissipated as heat, as well as being much smaller and lighter than other amplifier topologies. The switchmode power supply, with Power Factor Correction for worldwide operation, has very high voltage rails which can also provide high levels of current into the very low impedance of the 21" (530mm) drive unit.

The DSP system is programmed with a number of parameters which represent the model of the ideal "target" loudspeaker. The actual audio input signal is then processed, so that the real loudspeaker emulates this ideal target at all power levels. A differential pressure sensor is mounted close to the transducer and is part of a feedback loop which generates an error signal feeding the DSP system to compensate for the non-linearities of the acoustical load and of the transducer. DSP programming and firmware upgrades are performed using a PC via a single RS485 port on the rear of the enclosure. The same software also configures the onboard DSP to provide system delay, EQ and filtering as well as amplifier and driver excursion limiting.

*International Patents PCT/IT2006/00615, PCT/IT98/00031.
US Patent No. US 6,281,767 B1

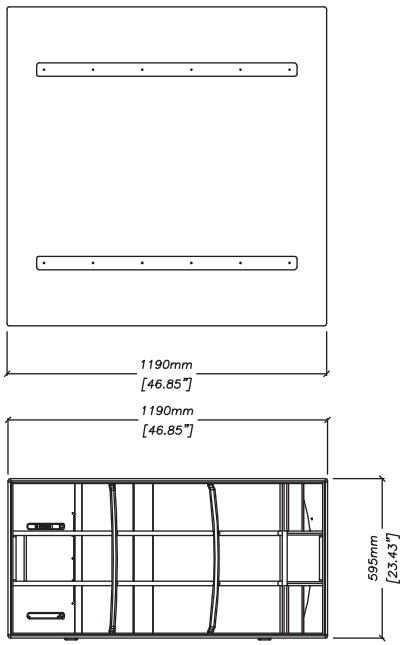
architectural and engineering specifications

The loudspeaker shall be a self-powered subwoofer with a single 21" (530mm) diameter cone transducer with a rated power of 2500W AES. The loudspeaker shall incorporate an integral Class D amplifier module with a peak output power of 8500W, a DSP system and a differential pressure sensor. Performance specifications of the complete system shall be as follows: Frequency response 30-150Hz ± 3dB. Maximum peak SPL 152dB, measured at 1 metre. The audio input connector shall be an XLR type female, with an XLR type male link.

The power supply shall have global mains operation over an operating range of 85V AC – 270V AC, 50/60Hz, with Power Factor Correction. The AC power connector shall be a Neutrik® Powercon®.

All loudspeaker components shall be mounted in a multi-laminate, birch ply enclosure with removable wheels. Install dimensions shall be: (W) 1200mm x (H) 600mm x (D) 1200mm, (W) 47.24ins x (H) 23.62ins x (D) 47.24ins. Dimensions (inc. wheels) shall be: (W) 1328mm x (H) 600mm x (D) 1200 mm, (W) 52.28ins x (H) 23.62ins x (D) 47.24ins. Weight 160kg (353lbs).

The loudspeaker shall be the Martin Audio ASX active subwoofer.



ASX

technical specifications

ACOUSTICAL	
TYPE	Hybrid® horn/reflex active subwoofer
FREQUENCY RESPONSE (1)	30-150Hz ± 3dB
MAXIMUM PEAK SPL (2)	152dB
RECOMMENDED CROSSOVER	60-120Hz
DRIVER	
TYPE	21" (530mm) diameter/ 6" (150mm) voice coil
PEAK DISPLACEMENT	± 1.2" (30 mm)
MECHANICAL DAMAGE LIMIT	± 1.5" (38mm)
RATED POWER	2500W AES, 10000W peak
AUDIO INPUT	
CONNECTORS	Female XLR input, male XLR link output
INPUT IMPEDANCE	10kΩ, balanced to ground
NOMINAL SYSTEM GAIN	32dB
INPUT LEVEL FOR MAX SPL	3.5V rms
S/N RATIO	>105dB
DISTORTION (100Hz)	<0.05%
AMPLIFIER SECTION	
TYPE	Single channel switchmode, fixed frequency
PK-PK OUTPUT VOLTAGE	390V
PK-PK OUTPUT CURRENT	200A
AVERAGE EFFICIENCY	85%
PEAK OUTPUT POWER	8500W
COOLING	2 x temperature controlled, variable speed fans 1 x forced air blower, venting in to horn mouth
POWER SUPPLY SECTION	
TYPE	Switchmode, fixed frequency with PFC
AC INPUT OPERATING RANGE	85V AC – 270V AC, 50/60Hz
AC OVERVOLTAGE TOLERANCE	400V AC
POWER FACTOR	> 0.95
AVERAGE POWER CONSUMPTION	300VA
MAINS CONNECTOR	Neutrik® Powercon®
DSP CONTROL INPUT	
RS485 PORT	RJ45 socket
GENERAL	
ENCLOSURE	Extensively braced, multi-laminate birch ply
FINISH	Black textured paint
PROTECTIVE GRILLE	Perforated steel
FITTINGS	2 pocket handles on each side, 2 wooden skids on top and bottom, 4 removable castors for transportation
INSTALL DIMENSIONS	(W) 1200mm x (H) 600mm x (D) 1200mm (W) 47.24ins x (H) 23.62ins x (D) 47.24ins
DIMENSIONS (INC. WHEELS)	(W) 1328mm x (H) 600mm x (D) 1200mm (W) 52.28ins x (H) 23.62ins x (D) 47.24ins
WEIGHT	160kg (353lbs)

Notes:
1. Measured in half-space
2. Measured in half-space at 1 metre with band-limited pink noise

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